

THE SETTLEMENT OF GRASSLANDS

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THE AGRICULTURAL settlement of the United States took nearly three centuries and involved two processes—horizontal movements of pioneer conditions across the continent and vertical movements of improvements within every community.

Quickenings and some lags occurred within the two processes. Old and new systems of farming and crop rotations might exist side by side for a considerable time. Grassland generally tended to be the marginal part of every farm, and its integration into a farming system was slow. To the average farmer, grass was only grass. While some kinds were eventually recognized as better than others for livestock, the general recognition of the place of the various grasses and forage plants in rotations, soil improvement, and animal nutrition came slowly and relatively late.

In considering the place of grasses in the farming of the Thirteen English Colonies that became the United States, we should recall two basic background situations. One is the state of the farming that was familiar to the folk who colonized the North Atlantic seaboard. The second is the state of the forage resources that they found where they settled.

Another point: In the history of grasslands settlement in the United States, several factors make careful historical delineations and generalizations difficult. Grass was generally such a taken-for-granted item that it was not commented upon in historical records unless something went amiss with the supply. In the records also, and especially in the seventeenth and eighteenth centuries, the terminology used for grasses was vague and overlapping—a grass might be known by one name in one part of the country and by quite a different one in another; or two distinct grasses might be known by the same name in different localities.

Although agriculturists have long

recognized the prime importance of an abundant supply of nutritious forage plants for the successful raising of livestock, the early colonists of the seventeenth century were not keenly cognizant of this fact. They came from an England whose agriculture was primitive. Arable and pasture land were still regarded as permanently separate. The introduction of a rotation of crops, founded on the field cultivation of roots and clover usually attributed to Sir Richard Weston, did not take place until after the first settlements in America were made, and popularization of improved methods of farming and of better livestock was still more than a century and a half away.

The vegetation of North America at the time of European colonization was strikingly deficient in forage plants suitable for livestock. The American Indians had made phenomenal progress in the domestication and development of economic plants, but they had used these for human food. They had no herbivorous domestic animals and had, therefore, no occasion to give attention to forage plants.

The first pastures in the English colonies were the natural openings or clearings in the lowlands along the banks of streams and the woods where the underbrush had been burned by the Indians for hunting. In these places the colonists found two native forage plants, the wild-rye and the broom-straw. The first was common along the Atlantic coast from Virginia northward, and the second was dominant in the Middle Colonies and in parts of New England.

These grasses grew high and thick, and the early commentators wrote enthusiastically about them. The cattle ate them freely during the summer, but shortly came the realization that it was practically impossible to make enough hay of these grasses to carry the cattle through the winter. The fact was that

the proportion of roughage to nutrient made them of little value as hay.

The attention the early settlers gave to the coarse reeds and sedges of the fresh- and salt-water marshes emphasizes the lack of good pasture and hay in the first half of the seventeenth century. If droughts reduced the forage, whole herds might be lost. Sometimes cattle were slaughtered to keep them from starvation, and there was always this danger as long as the livestock had to depend on native grasses.

It was not long, however, before the grasses of England appeared in the Colonies. On shipboard the animals were fed the forage provided for them, and when they were landed the ships were cleared of litter and manure. The grasses thus introduced spread rapidly and in a few generations came to be regarded as indigenous. In 1665 English grass, a term which regularly included bluegrass and white clover, was noted in a report on Rhode Island. In 1679, a visitor on Long Island saw fields of clover in bloom "which diffused a sweet odor in the air for a great distance."

Long before this time some of the seeding was intentional. In 1685 William Penn described an experiment in sowing English grass and noted that one of his colonists had sowed "great and small clover." As the seed used for these intentional sowings was unwinnowed chaff from hay stacks, the resulting pastures included an abundance of Old World weeds.

In view of the state of knowledge concerning livestock husbandry and the scarcity of labor, the first colonists turned their livestock loose on the unoccupied lands adjacent to their holdings as a matter of course and depended on the natural vegetation to carry them at all seasons. The realization that the rigorous winters of the more northern latitudes dictated shelters and supplies of fodder came slowly. As a system of mixed farming prevailed in all the earliest settlements, the protection of growing crops from the depredations of livestock was a prime necessity. En-

closures or fences of some kind were obviously needed, but fencing would have taken more labor than could be spared from clearing land, providing shelter, and cultivating crops. Out of this situation emerged several forms or stages of range husbandry which, generally speaking, were repeated again and again during the course of the American westward movement.

In New England and in the localities developed by New Englanders in New York and northern New Jersey, the method of community settlement made possible a system of common pasturage. The duties of the community cowherd who went through the village street every morning sounding his horn and gathering the livestock were set forth repeatedly in the ancient town records.

If the farmers of the community had enough sheep to justify segregation they were handled separately by a shepherd during the grazing season. Swine were especially troublesome and became the subject of more legislation than any other single agricultural matter. Circumstances soon compelled the registering of livestock brands and earmarks with the town authorities.

The Dutch of New Netherland had common pastures, and the practice was recognized legally when the colony was taken over by the English. In the Middle Colonies, where settlements were made by individuals without group co-operation at first, each farmer had to handle his own livestock. Farther south the same situation prevailed.

In the Southern Colonies the abundance of open range, even though poorly provided with grasses, discouraged the planting of artificial grasses. The straw of wheat, rice, and other small grains was used for roughage, and Virginia farmers sometimes pastured growing wheat. The soils of the Coastal Plain would have needed special fertilization for the growing of the ordinary meadow and pasture grasses and the extreme heat of the summers would also have hindered their extensive introduction.

On the frontier of the Southern Colonies a range-cattle industry developed—which was an eighteenth-century counterpart of the later industry on the Great Plains. Even at the close of the seventeenth century, herds of wild cattle and horses ranged on the western edge of the Virginia settlements. These animals were hunted by the planters, driven into pens, and branded as needed. Cattle raisers, learning from the fur traders about the rich pea-vine pastures of the uplands, pushed into the Piedmont. Sometimes they drove their herds from range to range; sometimes they established permanent ranges around the cowpens that they erected. The cattle were marketed in Charleston and later even driven to Baltimore, Philadelphia, or New York. Sometimes the cattle were sold to Delaware farmers for fattening. By the middle of the eighteenth century the outbreak of diseases necessitated colonial regulation of the cattle drives.

By the eighteenth century the problem of adequate pasturage on farms became accentuated. The supply of grasses in the woods and unenclosed meadows did not keep pace with the increase in livestock.

Pehr Kalm, the famous Swedish botanist who visited the Colonies in the middle of the century, noted that the pastures of the older settlements in Pennsylvania and New Jersey were failing because they were overstocked and the annual grasses could not ripen and reseed themselves. Because of the persistence of the practice of burning the woods, the timber forage declined. The lands, worn out from overtilage and then abandoned to a weed fallow, made poor pasture. Perhaps half of the average farm was a vast pasture largely overrun with sour grass, briars, and bushes. The farmers continued to cut their hay chiefly from the natural meadows and the marshes. Large quantities of coarse hay, chiefly *Carex*, were gathered, but as the livestock numbers increased the sources became increasingly unreliable.

Some time before 1750 the German farmers of Pennsylvania began to irrigate natural meadows. The streams flowing through the meadows were diverted along the hillsides and the water distributed by lateral ditches over the lowlands. The procedure often took much labor, but the increased hay crops apparently justified the expense. Farms with a large acreage capable of irrigation were highly valued. A few localities in New England also developed what was called "watered meadows." In the years 1745 to 1760 many of the salt marshes along the Delaware River were drained with dikes and tide gates and the land seeded to grain and then to clover or other English grasses.

A step of significance for the livestock industry was the creation of so-called artificial meadows. The seeding of tilled uplands with tame grasses as a substitute for weed fallow provided the farm stock with a very necessary and better supply of forage. The procedure was an important step forward in crop management.

In the eighteenth century such sowings increased, and selected seed began to be substituted for haymow sweepings. In 1749 Kalm saw fields of red clover near New York, and a decade later another observer found Pennsylvania farmers sowing clover seed "after they have harrowed in their wheat to make the crop stronger." The culture of clover, however, did not become widespread until after the American Revolution. By the beginning of the nineteenth century the advantage of using cultivated grasses on uplands as the source of hay had won recognition, and there was less reliance on natural meadows in the older and more settled parts of the country. Even the Pennsylvania-German farmers no longer valued irrigated meadows.

Timothy was the first grass cultivated in America to attract much attention. It was supposedly found growing near Portsmouth, in New Hampshire, about 1700 by a man named John Herd, and as its cultivation

spread through New England it came to be known appropriately as Herd's grass. Seed was taken to New York, Maryland, Virginia, and North Carolina by one Timothy Hanson, and there the plant was called timothy. Although long assumed to be indigenous in America, it is now recognized as an Old World plant that grew naturally in England, where it was called cats-tail grass. The cultivation of timothy spread through New England and the Middle Colonies during the eighteenth century. Its dominance as a hay plant in the United States today is a tribute to the shrewdness of the colonists who first recognized its value.

Different kinds of grasses had been tried in the Colonial South.

In 1635 the prospective settlers of Maryland were urged to bring a "good store of Claver grasse seede, to make good meadow."

In 1735 the settlers at Frederica, in Georgia, planted lucerne, and a few years later Eliza Lucas began experimental plantings of it in South Carolina. George Washington tried lucerne at Mount Vernon in the 1760's but the soil was not suitable.

Thomas Jefferson, in his *Notes on the State of Virginia*, published in 1785, stated: "Our grasses are Lucerne, St. Foin, Burnet, Timothy, ray [rye], and orchard grass; red, white and yellow clover; greensward, blue grass, and crab grass." The fact that Jefferson listed these grasses does not mean, however, that they were widely cultivated even in Virginia.

Before the American Revolution the growing scarcity of open range led some of the more enterprising planters of Maryland and Virginia to introduce timothy and clover and to give attention to watered meadows. But even in the 1790's foreign travelers noted the backwardness of the meadows in these States as compared with those to the north. In the Carolinas and Georgia even less attention was paid to artificial pastures and meadows. No wild grass was mowed for hay. The livestock shifted for themselves at all seasons.

The data of the first agricultural census delineate the Northeastern States as the main hay-producing area in 1839. Except where wheat dominated in western New York and Pennsylvania, hay was the staple. To the west of Ohio the cultivation of grasses and clover was still unimportant, and the hay harvested was largely native grasses. In the older settled East increased use was being made of clover and of gypsum, lime, and manure.

The growth of towns and cities necessitated stage, livery, and private stables. Until the advent of the motor-car and truck in the twentieth century, these stables were an ever-growing market for hay. As early as 1837 Essex County, in Massachusetts, supplied more than a thousand tons to the Boston market, and the average price was about \$16 a ton.

In the older communities of the Atlantic seaboard, market opportunities influenced the management of grasslands increasingly as the nineteenth century progressed. Localities that could specialize in beef fattening or dairying improved their upland mowing lands by sowing clover and other grasses and even permanent meadows might be manured occasionally. Arable fields were regularly laid down to grass after two or three grain crops and then mowed or pastured for several years.

The pasturage afforded by the natural openings west of the Alleghenies was richer than that of the Atlantic seaboard. The wild-rye and *Andropogons* grew more luxuriantly. The first settlers also found bluegrass and white clover, and their presence there in advance of settlement gave rise to the belief that they were indigenous. The cane along the banks of the rivers was used as forage for livestock. There were also two indigenous species, buffalograss and buffalo-clover, which were unknown east of the Alleghenies. The first of these was a coarse grass with a broad leaf. It belonged to the same family as the famous buffalograss of the Great Plains. The latter was a native clover.

The pioneer farmers who began to push westward across the Alleghenies during and following the American Revolution were confronted with the same task of carving out farms from the heavy timber just as their ancestors had done in the Atlantic Coastal Plain. Although the natural openings or treeless meadows were more numerous and extensive west of the Alleghenies, they were neglected except for pasturage. Nearly two centuries of the woodland farming had developed techniques which the pioneers did not abandon until confronted with the true prairies of Illinois. The farm seekers had come to select their soils on the basis of the kind of forest growth that covered them. It was reasonable to believe that land which grew only grass was not valuable.

In the Ohio River Valley the natural openings became the starting point of another extensive range-cattle industry. As early as 1805 George and Felix Renick of Ohio drove a herd of range cattle overland to Baltimore, where they cleared a profit of more than \$30 a head. Their success led to other similar drives, and shortly the marketing of range cattle in the East became the main source of cash income for many western farmers of that time. The cattle were started eastward in the early spring. Each night the herds were halted at drove stands, where food and shelter were provided for both the drovers and their charges.

By 1840 the farmers of the Ohio Valley had taken on the fattening of their own cattle with corn, and this development became concentrated in a zone bounded on the north by the 40° parallel and on the south by the 36° parallel. The Scioto Valley and the bluegrass region of Kentucky were centers of corn feeding, and many of the leaders in the enterprise were former Virginians who had known of similar methods on the banks of the Potomac in the days of Washington. Eventually these feeders reached out to the prairies of Illinois, Iowa, and Missouri for additional stock. In the

absence of large-scale refrigeration, the eastern cattle drivers continued until the coming of railroads.

By 1840 the westward movement was confronted with the true prairies of what came to be known as the Middle West. Many of the small prairies of Ohio and Indiana adjacent to rivers and timber had already been occupied, and the prairies of Stark County, Ohio, had become a leading wheat center. The oak openings and the small prairies of Michigan, Indiana, Wisconsin, Illinois, and Missouri then were being settled.

But the pioneers hesitated on the edge of the large prairies with their seemingly endless expanse of thick grass. There was a sense of vastness about them that seemed overpowering, an impression of a greatness that could not be subdued. Indeed, some contended that they would not be brought under cultivation for centuries.

There were many reasons for this hesitation on the edge of the prairies.

There was the lore of woodland farming that associated certain types of soil with specific stands of timber. Besides, forests were of great importance in the pioneer economy. They sheltered the game that constituted a chief source of meat, and they supplied logs for cabins, stock shelters, fuel, fences, furniture, and tools. They offered protection from winds and storms that open prairies did not give.

In addition to the lack of timber, the prairies did not provide a proper water supply until wells were dug. In some places the land of the prairies was low and swampy and needed to be drained before cultivation. Fever and ague attacked the settlers who tried these parts.

Another reason for avoiding the prairies was the desire to be near the watercourses that provided avenues of transportation. Trails into the prairies were practically impassable in the spring because of the deep mud.

It was soon demonstrated that the cast-iron plows brought from the East would not scour when used to break

the prairie sod. Large plows with wooden moldboards plated with iron strips would turn furrows, but it took as many as six yoke of oxen to pull them. The process of prairie breaking cost less per acre than woodland in terms of manual labor but far more in terms of animal power.

Necessity eventually forced the conquest of the prairies. By the 1840's the land east of the Mississippi River that provided the favorite combination of timber and small clearings was occupied by settlers or held by speculators. Latecomers had to try the prairies or go farther west.

The development of the steel plow provided a satisfactory means of turning over the sod. The building of railroads across the prairie region connected the farmers with better markets and brought them fuel and building material. The advent of the reaper pointed to the day when the farmers would prefer the open, level prairies with their glaciated soils for extensive grain production.

As the cost of timber for the traditional types of fences became almost prohibitive, resort was made to sod fences, smooth wire, and Osage-orange hedges, but the problem of fences on the prairies remained essentially unsolved until the invention of barbed wire in 1874—a simple thing, but one of great significance.

The problems of prairie settlement were not peculiar to the Middle West. They were much accentuated on the Great Plains, where the uncertainties of rainfall were an additional factor. Similar problems arose on the pampas of Argentina, the grassy steppes of Siberia, and even on the grasslands of North Manchuria when the Chinese migrated there this century.

The systematic occupation of semi-arid California was begun by the Spaniards in 1769. To this end they used three institutions—the presidio or military establishment, the pueblo or colonial settlement, and the mission. Of these the last became by far the most significant agriculturally. Although the

friars introduced the crops and fruits and irrigation practices of their Mediterranean homeland, the natural grasses and related vegetation were sufficient to support cattle raising as the dominant occupation during the Spanish-Mexican period, 1769–1848, and even into the 1860's, when droughts ended it as a distinctive industry.

Migratory sheep raising recovered from the droughts, reached its peak in 1874, and then began to decline. Except in isolated areas livestock husbandry became a subsidiary part of the specialized agriculture which came to dominate the California scene.

By 1850 the westward-moving frontier of agricultural settlement had reached the eastern edge of the Great Plains, where it halted for nearly two decades. Mounted on horses, the Plains Indians were a much more effective barrier to the advance of the white men than the native population to the eastward had been. For two and a half centuries the Plains Indians maintained themselves against the Spaniards, English, French, Mexicans, Texans, and Americans, despite missionaries, whiskey, diseases, gunpowder, and lead.

Besides, it was generally believed that this region was unfit for white settlement. The geographers of the day pictured large portions of it as the Great American Desert. In addition, the rush to the gold fields in 1849 and the years immediately following made California the great objective of those moving west. The Great Plains and the Rocky Mountain region became merely a long, tedious, and hazardous roadway to the Pacific coast. The basic reason, however, for the halt of the frontier at approximately the eastern edge of the Great Plains was that it, by virtue of its climate, challenged the accepted methods of agricultural conquest.

The vegetation of the Great Plains was strikingly different from that of the United States to the eastward. The level land from the ninety-eighth me-

ridian westward was practically treeless. The characteristic natural vegetation was grass and desert shrub, ranged according to the rainfall in generally north-to-south belts. In the low plains, like the prairies to the eastward, the grass was tall, luxuriant, and deep-rooted. To the west, on the High Plains, the grass was short but the surface sodded. Farther west the grass grew in tufts or bunches because the rainfall was too scanty to support continuous growth. In the arid intermountain region beyond, creosotebush was characteristic in the south, sagebrush in the north, and greasewood in the salt-desert areas.

The main short grasses were the grama, galleta, buffalo, and mesquite. Although not continuous, the grama grass extended through Colorado, New Mexico, Arizona, and Utah, especially in the higher valleys and plateaus. The galleta grass was found in New Mexico, Arizona, and Utah. The buffalo-grass thrived from the Panhandle of Texas to South Dakota. Mesquite grass grew where there was summer rainfall in western Texas, southern New Mexico, and Arizona.

Largely because of its natural vegetation the Great Plains became the scene of a range-cattle industry which far exceeded in scale and results any of its predecessors in American history. The building of the Union Pacific Railroad brought hunters who supplied the construction crews with buffalo meat, and its completion in 1869 let in additional throngs which eliminated the buffalo and left the grasses of the plains unused.

During the years of the Civil War a vast reserve of range cattle had grown up on the Texas plains. The growth of population in the East and the advance of the railroads into the Great Plains provided both a market and a means for shipping these cattle. This combination of circumstances enabled the range-cattle industry to dominate the Great Plains from the late sixties to the late eighties. A less-publicized but comparably important cattle busi-

ness overflowed from the interior of the Oregon Country during 1875-85.

Starting from their breeding grounds in lower Texas, great herds of cattle were driven northward to Abilene and other shipping points in Kansas. Later, herds were pushed into Nebraska, the Dakotas, and Montana, first to provide meat for Indian reservations and military posts and later to raise cattle for eastern markets. Incident to this business, trial-and-error experimentation developed standard procedures for trail management, the round-ups, and so on, which contributed so much romance and color to American history through western stories, movies, and folklore. The grass supply of the vast range of the Great Plains seemed unlimited, and the region was regarded as a permanent paradise for cattlemen.

About 1880 the boom element began to enter this cattle industry. Companies financed chiefly with outside, generally European, capital entered the business. The number of cattle increased rapidly, and soon the range was fully stocked. The land was still largely public domain, unfenced and unclaimed, except for extralegal holdings of the ranchers. Without regulated grazing, the supply of tall grass was soon exhausted, leaving only buffalograss and grama grass, and shortly these also were threatened in many places.

The lack of adequate provision for winter feed spelled widespread and terrific disaster when the unusually severe winter of 1886-87 came. The decreased grass supply of the summer range, due to the prolonged drought of 1886-95, brought further losses to the cattle companies, and the inroads of homesteaders on the range contributed other difficulties. Because of these circumstances, large-scale cattle ranching was gradually replaced by smaller operations.

The range-cattle industry eventually found farming invading its domain from both the east and west. The railroads had made the development of the industry possible; they also brought in homesteaders and other

land seekers who disrupted the range and forced the cattlemen to shift to a ranch basis. The uncertainties of the business, especially the water supply and the problem of winter forage, had long since demonstrated the value of permanent headquarters.

With the decline of gold production in California, the miners turned eastward to the unoccupied valleys and mountain ranges. Their rush into the region of Colorado laid the basis for permanent settlement there. The corresponding occupation of Nevada, Arizona, New Mexico, western Montana, Idaho, and eastern Washington took place during the decade of the Civil War. The need for food supplies for the mining camps led to the beginning of agriculture in the favored parts of the intermountain valleys.

The farmers from the East who pushed into the Great Plains brought with them the eastern ways of farming, but the fact that this was a region with less than 20 inches of rainfall a year foredoomed them to failure except in favored localities and years. In the end the farmers had to develop new methods and crops adapted to the region. In some places irrigation was the permanent solution. In others dry farming became important for the first time in the United States, and as a method it also had to pass through stages of adaptation and experimentation as regards tillage methods, machinery, crops, and rotations.

As long as the grass of the public domain was the main reliance for the grazing of stock, whether cattle, sheep, or horses, no thought was given by their owners to range conservation. The prevailing principle was first come, first served. Besides, the stockmen were unaware of the rudiments of forage growth and requirements of plants. Shortly the indigenous forage plants were being gnawed to the roots and so weakened that they gave place to worthless weeds and annuals or even only dust heaps. The shrubs along the streams were devoured and the meadows dried out, thus giving freshets a

chance to tear gashes in the sod and soil. This destruction, which took place both on the open plains and in the intermountain ranges, was accentuated in periods of drought.

The inevitable disasters resulting from the unbridled competition of the stockmen for the grass of the public domain were anticipated in the 1870's by Maj. J. W. Powell and a few other scientists.

Powell strongly urged classification of the remaining public lands and development of a scientific system of survey and disposal for each of the classes defined. The Public Land Commission, authorized by Congress in 1879, investigated the whole land system and proposed general reforms.

In the early 1880's there was a marked quickening of public interest in the conservation of the Nation's remaining natural resources. The attempts to reform the land system during President Cleveland's first administration met with only temporary success. The Federal Government remained committed to the principle of homesteads adopted in 1862 as the main means of developing the West. To this end various supplementary acts, which by their nature acknowledged that the homestead policy was not suitable for the region to which it applied, were passed. Even in 1916, when the Stock-Raising Homestead Act was enacted, Congress clung to the homestead principle at the same time that it belatedly acknowledged the destiny of much of the land in the West.

Not until the end of the nineteenth century was the necessity for regulating grazing on the public domain generally conceded by stockmen. At a national meeting in Denver in 1898 two divergent proposals were considered. One called for the ceding of the remaining public lands to the States, and this idea continued to have its advocates as late as President Hoover's administration, when it was embraced as the official objective of the executive branch of the Government. The other proposal

at Denver urged that the Federal Government lease the public lands for grazing. Being better able to adjust to varying conditions, the sheep interests opposed all suggestions, but many of the cattlemen ultimately favored some form of control similar to that which the Forest Service was gradually working out for the management of the grazing ranges within the national forests. By this system stockmen were issued annual permits to graze a specified number of livestock on a range deemed big enough to support them.

The ultimate solution of the problem was provided by the Taylor Grazing Act of 1934, which undertook "To stop injury to the public grazing lands by preventing overgrazing and soil deterioration; to provide for their orderly use, improvement, and development; to stabilize the livestock industry dependent upon the public range. . . ." To effect these ends, 142,000,000 acres of the public lands were to be organized into grazing districts under the control of the Department of the Interior. It was also given broad powers to develop water power, to carry on soil-erosion control, and to provide for the disposal of land not needed for the grazing districts.

The history of grasslands settlement in the United States reveals definite patterns of utilization that were largely determined by the relationship between the supply of grassland and population.

In most newly settled communities the livestock were turned loose to graze on such grasses and other palatable vegetation as they could find in the natural clearings and woods. While in this stage, the owners of the livestock might be engaged in clearing their first fields for corn and garden crops, but there was nothing even approximating systematic crop farming. Communities settled by group action might hire one or more herders to watch their livestock.

The second stage emerged when the keeping of large numbers of stock by semiherding methods was combined

with the production of crops. In this stage, and sometimes also in the first, the crops rather than the livestock were enclosed with fences of some sort.

The third stage began to develop when the grass on the range became scarce, and the raising of livestock had to be integrated with general farming. With the introduction of this stage, the first steps toward systematic animal husbandry were taken. In some communities, especially in plantation districts and other staple-producing areas, the raising of stock became subordinate to the production of staples and was continued largely for domestic needs. In other communities, notably in the Corn Belt as it moved westward to its present location, livestock continued to have an important place and most of the crops were marketed in the form of animals ready for slaughter. Cattle also gained a dominant place in communities that specialized in dairying.

In this third stage consideration had to be given to grassland, regardless of what the livestock were kept for, because they had to have pasture of some sort during the grazing season and hay for the winter. The farmers might depend on enclosed natural grassland, either clear or cut-over, for considerable time. In the end, however, they had to integrate the grassland with the rest of the farming system. They might try to improve the natural meadows by cursory seeding to tame grasses, by manuring, or even by irrigation.

The nature of the open-range stage of grassland utilization ultimately necessitated not only community but colony-wide and State-wide regulations of various sorts. The depredations of wild animals and Indians led to the hiring of herders and similar safeguards. Most communities also burned the range in order to get a seemingly luxuriant spring growth of grass, regardless of injuries to the soil. The supply of grass also led to regulations as to who could utilize the range. To facilitate identification and to thwart stealing, extensive legislation concerning branding and earmarks became

necessary. In the early development of farming communities the relatively small acreage in crops led to the requirement that the crops rather than the range be fenced, but as communities became well settled this practice was usually reversed. Even in the colonial period, this situation with regard to fencing resulted in fence wars.

The limitations and failures of the grass supply led to range wars between ranchers or groups of ranchers and also between cattlemen and sheepmen. Incident to such clashes, associations were formed which, among other things, divided the range into zones of priority for the various herds. Each rancher had to give attention to the water supply needed for his herds. A group of buildings to use as headquarters for the range operations was also necessary. Probably the earliest record in United States history of such headquarters is a court judgment on the Eastern Shore of Virginia in 1634 which refers to the "cowpens" of that time. Except in the southern latitudes, the problem of winter feed shortly pressed for attention. At first this was usually met by making hay of the natural grass. Later fields of tame grasses, legumes, or fodder plants were developed for the purpose. In the end the operations were shifted from the

open range on the public domain to ranches on privately owned land. In other words, the range industry became a ranch industry.

Sooner or later individuals who wished to develop farms invaded the domain of the range industry. The result was friction and conflict until one or the other way of life prevailed. The interests of the rancher and the nester clashed inevitably not only along the Atlantic coast in the seventeenth century but in the Great Plains as late as the early twentieth century. Ultimately the issue was usually resolved according to the economic returns from the land. Farming of some sort prevailed in the humid regions and also in semiarid regions where irrigation and dryland methods could be used. In the semiarid regions ranching as the most profitable occupation continued on private holdings and on public grazing districts where geographical factors gave it the necessary advantage.

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A BILLION ACRES OF GRASSLANDS

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THE GRASSLANDS, hay lands, and forested range lands of the entire United States cover more than a billion acres, nearly 60 percent of the total land area. They furnish about half of the feed for all livestock. Two-thirds of this land is privately owned. The rest, mainly in the dry and mountainous parts of the Western States, is publicly owned. More than half of the farms and ranches of the country depend largely on grassland for feed.

Originally about 700 million acres

in the United States were covered with grass, usually mixed with other herbaceous plants. Nearly 250 million acres of that grassland have been plowed up and used for crops or for pasture in rotation with crops, including about 10 million acres of irrigated land.

The grasslands of the central prairies formed the largest body of highly productive soils in America; they have been converted almost entirely to cropland. Semiarid, desert vegetation characterized about 400 million acres, of